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VERIFIED TRANSLATION

I, the undersigned Patricia HARDING, BA(Hons),
technical translator to RWS Group plc, of Europa House, Marsham Way, Gerrards Cross,
Buckinghamshire, England, do hereby declare:

(1) That I am well familiar with the Swedish and English languages;
(2) That the attached is a true and accurate translation into the English language of
the Swedish text of this Patent Application entitled "Information Processing - 2" that was
filed in the US Patent and Trademark Office on 31 May 2000.

(3) That all statements made herein of my own knowledge are true and that all
statements made on information and belief are believed to be true; and further that these
statements were made with the knowledge that willful false statements and the like so made
are punishable by fine or imprisonment, or both, under § 1001 of title 18 of the United States
Code and that such willful false statements may jeopardize the validity of the application or
any patent issued thereon.

Dated this 21st day of August 2000


P. HARDING

For and on behalf of RWS Group plc

AP0015

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UNITED STATES PATENT APPLICATION

OF

OLA HUGOSSON
AND
STEFAN BURSTRÖM

FOR

INFORMATION PROCESSING - 2



Field of the Invention

This invention concerns a system for information processing, a server unit which is arranged to form part of a system for information processing, and a user unit for recording information.

Background of the Invention

In US 5,852,434 a system is shown for electronic recording of handwritten text. According to this system a writing surface is provided with a position code which makes it possible to determine the position of a pen on the surface by reading the position code locally in the position in which the pen is located. By continually recording the position of the pen when this is used to write on the writing surface, the written text can be recorded electronically in the form of coordinates for the position of the pen on the sheet of paper and can be stored in a computer to which the pen is connected.

Assume now that a company wants its customers to be able to send handwritten orders or other types of handwritten messages to the company. The problem then arises of how the customer is to specify the address of the company and how the message is to be sent to the company.

Summary of the Invention

An object of this invention is to completely or partially solve the above-mentioned problems.

This object is achieved by a system for processing information according to claim 1, a server unit according to claim 8 and a user unit according to claim 11.

According to a first aspect of this invention, more specifically a system is provided for information processing, which system comprises a server unit in which is stored data about a plurality of domains, each of which represents an area on at least one imaginary surface, an address being associated with each of said domains; a user unit which is arranged to record information comprising at least two coordinates and to send said at least two coordinates to the server unit; the server unit being arranged, in response the receipt of the information from the user unit, to identify the domain to which the coordinates belong and to send the address associated with the identified domain to the user unit.

The invention is based on the idea that a position-coding pattern which is used to record handwritten information can also be used to control where the information is to be sent. The invention is also based on the idea that a position-coding pattern which codes a very large number of positions on an imaginary surface can be divided into different areas, so-called domains, different interested parties being allowed to have exclusive rights to different domains, that is different subsets of the position-coding pattern. An address can be associated

with each domain, for example the address of the domain owner. The domain owner can then reproduce his subset of the position-coding pattern on order forms or on other documents or products on which a customer can write messages which are to be sent to the domain owner.

When a user wants to send a message, for example an order, to a particular domain owner, he writes his order on the domain owner's order form using a user unit. The user unit records the message in the form of coordinates by reading the position-coding pattern and sends at least two of the coordinates to a predetermined address, namely a server unit which stores data concerning the domains and the addresses associated with these. The server unit identifies the domain belonging to the received coordinates and sends the address associated with this to the user unit which can now send the whole message to the address obtained.

An advantage of the invention is that the user does not himself need to enter any address, as the position-coding pattern on which the message is written defines the address. The position-coding pattern thus carries out the double task of both making possible digital recording of handwritten information and of defining an address. The system is therefore simple and uniform for the user to use.

The two coordinates make it possible to determine a point on the imaginary surface and thereby the domain

affiliation. The coordinates can be sent to the server unit in a form that requires processing in order to determine the domain affiliation. In order to reduce the risk of errors, coordinates for more than one point can be sent to the server unit. If there are several imaginary surfaces, a third coordinate can be used in addition to define which imaginary surface is involved.

In an advantageous embodiment, the information recorded by the user unit is represented by a plurality of coordinates, of which only a subset, preferably two coordinates, is sent to the server unit. The whole message which the user writes does not therefore need to be sent to the server unit, as two coordinates are sufficient to determine the domain affiliation and hence the address to which the whole message is to be sent. Any two coordinates for a point in the recorded information can be sent to the server unit.

A system is described in the Applicant's Patent Application SE 9904745-8, which was filed on 23 December 1999 and was not published at the time of the filing of the present application, in which system the whole message is sent from the user unit to the server unit and processed there in various ways depending upon the domain affiliation of the coordinates. The present invention has the advantage that it reduces the traffic to the server unit, as only the coordinates for one point need to be

sent to the server unit and the user's message is sent direct to the domain owner.

The user unit can be a digital pen which can be used for writing ordinary pigment-based information on a sheet of paper, which information is simultaneously recorded digitally in the user unit. The user unit can also be some other hand-held electronic device by means of which information can be recorded, for example a PDA with a touch screen. In this example, information can be recorded by a user writing the information on the screen and coordinates being generated on the basis of the location on the screen where pressure is applied.

The address which is associated with each domain can be of various types. It can be an IP address, a fax address, a telephone number, or any other address which is specified by the domain owner and to which the user unit can send the message.

The system can advantageously include a number of user units which all communicate with the same server unit.

The user unit has suitably a unique user identity, the user unit being arranged to send the user identity to the server unit together with the coordinates. The unique identity can, for example, be a production number or other form of code which has been stored in the user unit specifically for this purpose. The user identity can be

used by the server unit to determine to which user unit the address is to be sent.

In one embodiment the server unit can be arranged to attach to the address a program file which is associated with the domain in question. The program file is executed by the user unit. In this way a domain owner can ensure that messages which are written on his domain are processed in a particular way before they are sent to the address which the user unit receives from the server unit.

Advantageously, each user unit has a pen point. When the user uses the user unit to write, both a paper copy and an electronic description of what was written will then be obtained. However, the user unit can be used exclusively for electronic recording of coordinates.

The operations described above, which are carried out by the server unit, are preferably performed with the aid of suitable software in the server unit.

As is evident from the above, the system advantageously includes a base from which the coordinates are recorded. The base can be any kind of base which can be provided with coordinates that can be recorded using a user unit. For example, the base can be a sheet of paper.

In an advantageous embodiment, a subset of a position-coding pattern which codes a large number of points on said imaginary surface is reproduced on the base, the coordinates which are recorded by the user units being

coordinates for points on the imaginary surface and being recorded by means of the subset of the position-coding pattern on the base. The subset is preferably located within one domain. Figuratively speaking, it can be regarded as cutting out a subset or a partial area of the position-coding pattern and placing it on the base. This partial area codes at least one point on the imaginary surface. By reading the position-coding pattern in the partial area, it is possible to determine the coordinates of one or more points within the partial area and, by means of these coordinates, it is thus possible to determine the domain affiliation and hence the address to which the recorded address is to be sent. The partial area preferably codes several points on the imaginary surface, so that characters can be written on the partial area and can be recorded digitally.

Various position-coding patterns are described, for example, in US 5,852,434 and in the Applicant's own Patent Applications SE 9901954-9 and SE 9903541-2 which were filed on 28 May 1999 and 1 October 1999 respectively and were therefore not published at the time of the filing of this application. The above-mentioned Swedish applications are to be regarded as part of this application by means of this reference.

According to a second aspect of the invention, this concerns a server unit, which is arranged to form part of a system for information processing, the server unit hav-

ing a memory in which is stored data about a number of domains, each corresponding to an area on at least one imaginary surface, and the server unit being arranged, in response to the receipt of information which contains at least two coordinates, to determine the domain to which the coordinates belong and, on the basis of the domain affiliation, to determine how the information should be processed.

The advantages of the server unit are evident from the discussion of the system.

According to a third aspect of the invention, this concerns a user unit for recording information which comprises at least two coordinates, which user unit is arranged to send said at least two coordinates to a server unit and, in response to the receipt of an address from the server unit, to send the recorded information to said address.

This user unit utilizes the same principle as described above, namely that coordinates are used both to record information and to determine where the information is to be sent, so that the user does not need to enter any address herself.

According to fourth aspect of the invention, this concerns a storage medium for digital information which can be read by a computer system, wherein the storage medium contains a computer program, which includes instructions for causing a processor to determine, in

response to the receipt of at least two coordinates from a user unit, to which of several domains, each of which corresponds to an area on an imaginary surface, the coordinates belong and to send an address associated with the identified domain to the user unit.

The storage medium with the computer program is used advantageously to implement the operation of the server unit.

Brief Description of the Figures

This invention will now be described in greater detail by means of embodiments and with reference to the accompanying drawings, in which

Figure 1 shows schematically a system according to an embodiment of the present invention,

Figure 2 shows schematically an example of a user unit, and

Figure 3 shows schematically an example of a data structure in the memory of the server unit.

Description of Preferred Embodiments

Figure 1 shows an example of how a system according to the invention can be structured. The system comprises principally a base 1, a user unit 2, a network connection unit 3 and a server unit 4.

The Base

The base 1 can be any base which can be provided with coordinates such that they can be read by the user unit. The coordinates can be stated in explicit or in

coded form. The base has preferably a writing surface on which the coordinates are arranged.

In this example, the base 1 consists of a sheet of paper which is provided with a position-coding pattern 5 across its entire surface, which position-coding pattern is shown greatly simplified and enlarged as a number of dots on the sheet of paper. The position-coding pattern on the base constitutes a subset of a larger position-coding pattern.

The Position-coding Pattern

The position-coding pattern, 5 has the characteristic that if any part of the pattern of a certain minimum size is recorded, then the position of this part in the position-coding pattern and hence on the sheet of paper can be determined unambiguously.

The position-coding pattern 5 can be of the type shown in the above-mentioned US 5,852,434, where each position is coded by a specific symbol.

However, the position-coding pattern is advantageously of the type shown in the Applicant's above-mentioned Applications SE 9901954-9 and SE 9903541-2, where each position is coded by a number of symbols and where a symbol is used to code a number of positions.

The position-coding pattern is made up of a small number of symbol types. One example is shown in SE 9901954-9, where a larger dot represents a "one" and a smaller dot represents a "zero". Another example is shown

in SE 9901954-9, where four different displacements of a dot in relation to a raster point code four different values.

The User Unit

Figure 2 shows an example of a user unit, which in this case consists of a digital pen. The pen comprises a casing 11 which is approximately the same shape as a pen. In the short side of the casing there is an opening 12. The short side is intended to be in contact with or to be held a short distance from the surface on which the position determination is to be carried out.

The casing essentially contains an optics part, an electronic circuitry part and a power supply.

The optics part comprises at least one light-emitting diode 13 for illuminating the surface which is to be imaged and a light-sensitive area sensor 14, such as a CCD or CMOS sensor, for recording a two-dimensional image. The user unit may also comprise a lens system.

The power supply for the user unit is obtained from a battery 15 which is mounted in a separate compartment in the casing.

In addition, the user unit comprises a pen point 17 by means of which the user can write ordinary pigment-based writing, which is recorded simultaneously by the user unit by means of the position-coding pattern. The pen point 17 can be extended and retracted so that the user can control whether or not it is to be used.

The user unit also comprises buttons 18 by means of which the user unit is activated and controlled. It also comprises a transceiver 19 for wireless communication with external units, for example using infrared light or radio waves.

The electronic circuitry part comprises a processor 16 which is programmed to read an image from the sensor 14, to identify symbols in the image, to determine which two coordinates are coded by the symbols and to store these coordinates in its memory. The processor 16 is also programmed to analyze stored pairs of coordinates and to convert these into a polygon train which constitutes a description of the movement of the user unit across a surface provided with the position-coding pattern. This polygon train thus represents the information which was recorded by the user unit. The processor 16 is also programmed to select a pair of coordinates from the recorded pairs of coordinates and to send this pair of coordinates to the server unit 4 via the transceiver 19 and the network connection unit 3. Finally, the processor 16 is programmed to send all the recorded information to an address which it receives from the server unit in response to the sending of the pair of coordinates.

Communication with the Server Unit

As is evident from the above, the user unit is arranged to transfer coordinates recorded by the user to the server unit 4. In this example, the information

is transmitted by wireless means to the network connection unit 3, which in turn transfers the information to the server unit 4.

In this example, the network connection unit is a mobile telephone 3. Alternatively, it can be a computer or some other suitable unit which has an interface to a computer network, for example the Internet or a local company network.

Alternatively, the network connection unit 3 can be integral with the user unit 2.

The communication between the user unit and the network connection unit, which are normally located fairly close to each other, can be carried out via infrared or radio waves, for example according to the Bluetooth standard, or some other standard for information transfer over short distances. The transfer need not be wireless, but can also be carried out by cable.

The Server Unit

The server unit is a computer in a network of computers. It has the same structure as a conventional server unit with one or more processors, various kinds of memory, peripherals, and connections to other computers in the network, but it has new software for carrying out the operations described here. It also has a memory 8 (see Figure 1) in which data concerning a number of domains is stored.

As is evident from the above, several user units can be arranged to send coordinates to the server unit which is thus a central unit in the system. However, several such systems can be combined to create an even larger system.

The server unit does not need to be part of a global computer network, but can be part of a local network and can be used for processing information, for example within a company.

The Imaginary Surface

Information about domains on at least one imaginary surface is stored in the memory of the server unit. The imaginary surface can thus be described as a surface in a coordinate system, which surface thus contains a large number of points which are systematically arranged in two dimensions with a certain given resolution. Each point can be defined by two coordinates. If there is more than one imaginary surface, more than two coordinates may be required to define a point.

On the imaginary surface there are a number of areas which can thus be described as domains. The domains can be of different sizes and shapes. The smallest domain comprises a single point on the surface. The whole surface need not be covered by domains. Information about these different domains is stored in the server unit. A rectangular domain can, for example, be described by

means of pairs of coordinates representing the points in the corners of the domain.

Address

An address for each domain is stored in a data structure in the memory 8 of the server unit.

Figure 3 shows an example of such a structure, which in this case is a table. In a first column 30 in the table, the domains on the imaginary surface are defined by means of coordinates $(x_1, y_1; x_2, y_2; x_3, y_3; x_4, y_4)$ for the corners of the domains, which in this case are assumed to be rectangular. A second column 31 defines an address to which information which relates to the domain is to be sent. For the sake of clarity, only one domain is shown in the structure, which of course normally contains a large number of domains with associated addresses.

Operation of the System

In this embodiment the operation of the system is as follows. A user writes information on a sheet of paper 1 using the user unit 2. The information is recorded electronically while it is being written by means of the user unit 2 continuously recording the part of the position-coding pattern which is located within the field of view of the area sensor while the user is writing. The processor 16 converts the position-coding pattern into coordinates. The processor thus generates a sequence of pairs of coordinates describing how the user has moved the user

unit across the sheet of paper while writing. The processor compresses this information by converting it into a polygon train. One of the recorded pairs of coordinates is then sent to the server unit 4 via the network connection unit 3.

When the server unit 4 receives the pair of coordinates, it determines to which domain the pair of coordinates belongs. The address associated with this domain is sent back to the user unit which sends all the recorded information to the address obtained from the server unit via the network connection unit 3. The address can, for example, be an IP address of a computer in a computer network, which is shown schematically in Figure 1 by the dotted box 6.

In addition to the address, one or more of the domains in the server unit can be associated with a program file. When the server unit determines that such a program file is associated with the domain for which a pair of coordinates is received from the user unit, it also sends the program file to the user unit. The program file is executed in the user unit with the recorded information as input data. The processed information is then sent to the address which was received from the server unit.

What we claim and desire to secure by Letters Patent is:

1. A system for information processing, characterized by

a server unit (4) in which is stored data concerning a plurality of domains, each of which represents an area on at least one imaginary surface, an address being associated with each of said domains,

a user unit (2) which is arranged to record information comprising at least two coordinates and to send said at least two coordinates to the server unit;

the server unit (4) being arranged, in response to the receipt of the coordinates from the user unit (2), to identify the domain to which the coordinates belong, and to send the address associated with the identified domain to the user unit.

2. A system according to claim 1, wherein the user unit (2) is arranged, in response to the receipt of said address from the server unit (4), to send the recorded information to said address.

3. A system according to claim 1 or 2, wherein the information recorded by the user unit comprises a plurality of coordinates, of which only a subset is sent to the server unit.

4. A system according to any one of claims 1, 2 or 3, wherein the user unit (2) has a unique user identity

(continued)

(continued claim 4)

and is arranged to send the user identity to the server unit together with the coordinates.

5. A system according to any one of claims 1-4, wherein the server unit is also arranged to send a program file which is associated with the identified domain to the user unit.

6. A system according to any one of the preceding claims, also comprising a base (1) from which said at least two coordinates are recorded.

7. A system according to claim 6, wherein a subset (5) of a position-coding pattern which codes a large number of points on said imaginary surface is reproduced on the base, the coordinates which are recorded by the user units being coordinates for points on the imaginary surface and being recorded by means of the subset of the position-coding pattern on the product.

8. A server unit, which is arranged to be incorporated in a system for information processing, characterized by

a memory in which is stored data about a number of domains, each of which corresponds to an area on an imaginary surface, an address being associated with each one of said domains,

the server unit being arranged, in response to the receipt of at least two coordinates from a user unit, to

(continued)

(continued claim 8)

determine to which domain the coordinates belong and to send the address associated with the identified domain to the user unit.

9. A server unit according to claim 8, wherein the server unit is also arranged to send a program file which is associated with the identified domain to the user unit.

10. A sever unit according to claim 8 or 9, wherein said address is an IP address.

11. A user unit for recording information which comprises at least two coordinates, characterized in that the user unit is arranged to send said at least two coordinates to a server unit and, in response to the receipt of an address from the server unit, to send the recorded information to said address.

12. A user unit according to claim 11, wherein the information recorded by the user unit comprises a plurality of coordinates, of which only a subset is sent to the server unit.

13. A user unit according to claim 13, which consists of a digital pen.

14. A storage medium for digital information which can be read by a computer system, wherein the storage medium contains a computer program which comprises instructions for causing a processor to determine, in

(continued)

(continued claim 14)

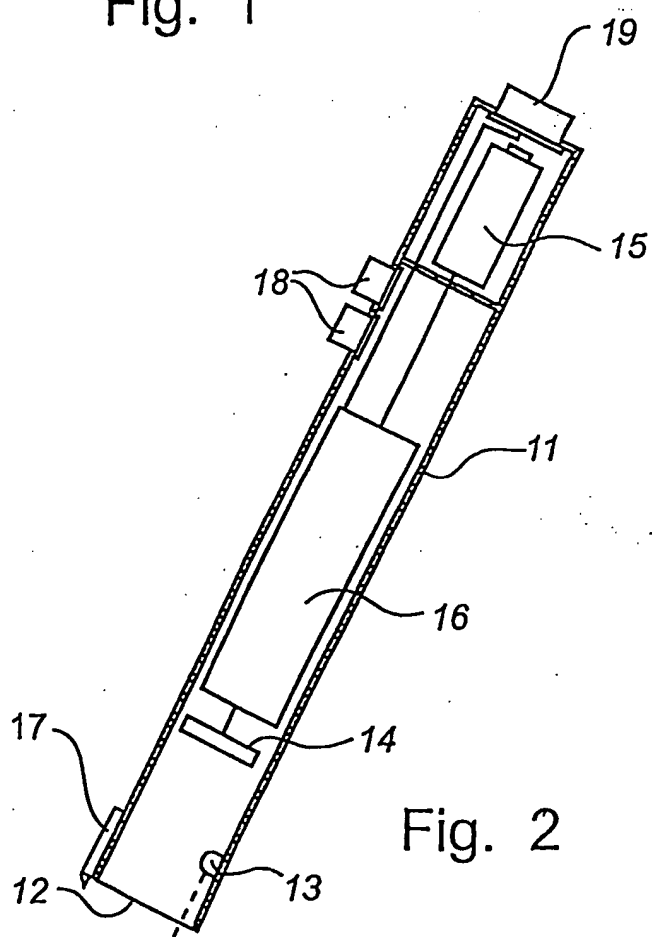
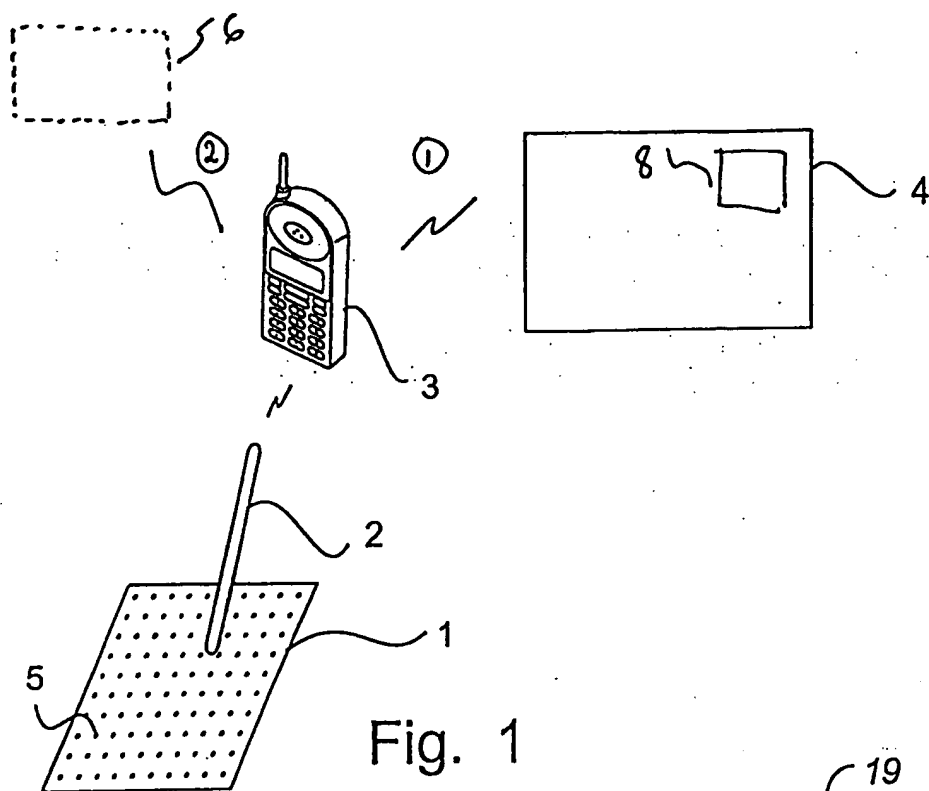
response to the receipt of at least two coordinates from a user unit, to which of a plurality of domains, each of which corresponds to an area on an imaginary surface, the coordinates belong and to send an address associated with the identified domain to the user unit.

Abstract of the Disclosure

A system for information processing comprises a server unit (4), in which is stored data about a number of domains, each of which represents an area on at least one imaginary surface, an address being associated with each domain. A user unit (2) records information which comprises at least two coordinates and sends the coordinates to the server unit. When the server unit (4) receives the coordinates, it identifies the domain to which the coordinates belong and sends the address associated with the identified domain to the user unit.

A server unit and a user unit are also described.

Elected for publication = Fig. 1



Domain	Address
(X ₁ Y ₁); (X ₂ Y ₂) (X ₃ Y ₃); (X ₄ Y ₄)	A@home.com

Fig. 3